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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,538	03/29/2005	Yoshihiro Hara	38037	4575

52054 7590 08/27/2007

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2618	

MAIL DATE	DELIVERY MODE
08/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,538	HARA ET AL.	
	Examiner	Art Unit	
	Charles Chow	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 12-16* is/are rejected.

7)☒ Claim(s) *10 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/29/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 3/29/2005 is in compliance with the previsions of 37 CFR 1.97. According, the information disclosure statement is being considered by the examiner.

Abstract

2. The abstract of the disclosure is objected to because the abstract is too long, near 198 words. Correction is required. See MPEP§ 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.
The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc. implied language.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.
>
> The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1, 3-5, 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Heinonen et al. [US 5,530,923].

For claim 1, Heinonen et al. [Heinonen] teaches a transmitter [Fig. 1] for outputting a transmitting signal while amplifying power of the transmitting signal [the outputting amplified signal by high power amplifiers 10, 12 for transmitting via antenna in Fig. 1, based on the linear/non-linear transmitting mode, Fig. 1 & col. 3, lines 37-46, abstract] comprising:

a variable gain amplification [18] means for amplifying an input modulated signal based on the transmitting signal [col. 4, lines 3-5] and controlling the gain based on a control signal [control signal 34, 35 from control means 24, for adjusting the gain of amplifier 18 & 10, col. 4, lines 48-55 & col. 4, lines 48-55];

a power amplification means [10] connected to the rear of the variable gain amplification means [18]; and a power amplification control means [24] for controlling a supply voltage of the power amplification means on the basis of the control signal [control signal 35 from means 24 via feedback for regulating the gain by adjusting the supply voltage of 10, col. 3, lines 51-56 & col. 4, lines 48-55], wherein:

the power amplification means has a linear operating mode for amplifying power by using a linear operating region in input-output power characteristic of the power amplification means [the operating in linear/digital power amplifying mode in col. 4, lines 26-46; the adjusting of the biasing point/supply voltage of 10 in linear/digital mode, region of the input-output power characteristic, in col. 4, lines 18-55] and

a saturation operating mode for amplifying power by using a saturation operating region in input-output power characteristic of the power amplification means [the operating in non-linear/analog, saturation, of the power amplifying mode in col. 4, lines 12-25; the adjusting of the biasing point/supply voltage of 10 in non-linear/analog, saturation, mode, region of the input-output power characteristic, in col. 4, lines 18-55].;

the control signal [mode selection signal on terminal 28] includes an operating mode set signal for setting the operating mode of the power amplification means [the mode control means 25/switch14/16 set the power amplifier 10/12 into linear or non-linear/saturation mode, Fig. 1 & col. 3, line 61 to col. 4, line 2]; and

the power amplification means operates in either operating mode on the basis of the operating mode set signal [the power amplifier 10/12 operates in either linear or non-linear mode according to the mode setting from control means 25/switch14/16 set, Fig. 1 & col. 3, line 61 to col. 4, line 2; non-linear mode/linear mode of operation in col. 4, lines 12-40].

For claim 3, Heinonen teaches the transmitter [Fig. 1], wherein the gain of the variable gain amplification means in the case where the power amplification means is operated in the saturation operating mode is controlled to be higher by a predetermined value than that in the case where the power amplification means is operated in the linear operating mode [when switched into linear mode from non-linear/saturation mode, the gain is backed off by a predetermined value of 6 dB from the non-linear/saturation mode, col. 4, lines 26-40].

For claim 4, Heinonen teaches the transmitter [Fig. 1], wherein the power amplification control means [24] performs control so that the supply voltage is changed in accordance with instantaneous output power of the power amplification means in the saturation operating mode [when switched to the non-linear/analog, saturation, mode, the gain of the power amplifier 10 is controlled via means 24 based on the feedback from means 20, for controlling the power output level, instantaneously, col. 4, lines 41-55 & col. 3, lines 46-56].

For claim 5, Heinonen teaches the transmitter [Fig. 1], wherein the power amplification control means [24] performs control so that a bias point set for the power amplification means is changed on the basis of the supply voltage input to the power amplification means

[the biasing point/supply voltage is adjusted for regulating the gain of amplifier 10 via control means 24, col. 3, lines 51-60 & col. 4, lines 48-55].

{ Note: **Ngo et al. [US 2003/0155,972 A1]** teaches the Vramp for controlling the supply voltage of amplifier state 62, 64 for the saturated mode and the linear mode of operation, Fig. 2/Fig. 4, paragraph 0027-0028, 0001 }

For claim 15, Heinonen teaches a transmission output control method for controlling a transmission output [the method for the linear and non-linear transmitting mode associated with the output controlling of the transmitting amplifiers 18, 10, 12, Fig. 1, abstract & description in col. 3, lines 37 to col. 4, line 40], comprising the steps of

amplifying an input modulated signal, variable gain amplification step [the variable gain amplifier 18 for amplifying modulated input signal at input 36 for transmitting, col. 4, lines 3-5; adjusting gain of 18 in col. 4, lines 18-55],

amplifying power in a state in which an output generated by the variable gain amplification step is input to a power amplification means, power amplification step [power amplifier 10 amplifies the input signal from output of the variable gain amplifier 18, as the operating connection shown in Fig. 1]; and

controlling a supply voltage to the power amplification means and an input to the power amplification means to thereby control the operating mode of the power amplification means [the control 34 for controlling the supply voltage of the power amplifier 10, col. 3, lines 51-56 & col. 4, lines 18-55],

to switch the operating mode over between a linear operating mode for operating the power amplification means [to regulating the gain of power amplifier 10 in analog or digital mode in col. 4, lines 18-55; non-linear/analog mode or linear/digital mode, col. 3, line 61 to col. 4, line 2],

in a linear operating region in input-output power characteristic of the power amplification means [the operating in linear/digital power amplifying mode in col. 4, lines 26-46; the adjusting of the biasing point/supply voltage of 10 in linear/digital mode, region of the input-output power characteristic, in col. 4, lines 18-55], and

a saturation operating mode for operating the power amplification means in a saturation operating region in the input-output power characteristic [the operating in non-linear/analog, saturation, of the power amplifying mode in col. 4, lines 12-25; the adjusting of the biasing point/supply voltage of 10 in non-linear/analog, saturation, mode, region of the input-output power characteristic, in col. 4, lines 18-55].

For claim 16, Heinonen teaches a radio communication apparatus [hand-held phone of the mobile phone system, col. 2, line 65 to col. 3, line 9] having a transmitter [Fig. 1] as shown in claim 1 above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinonen in view of Okubo et al. [US 2004/0041,628 A1].

For claim 2, Heinonen teaches the transmitter [Fig. 1], but fails to teach the temporal change of an amplitude component.

Okubo et al. [Okubo] teaches the wherein the modulated signal input to the power amplification means has a temporal change of an amplitude component [the temporal change in the envelope of the input signal in Fig.8(a)-Fig. 8(c) & paragraphs 0143-0149; the

compensation for the amplitude, phase distortion in paragraph 0150], such that, It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve Heinonen with Okubo's distortion compensation for the temporal change, such that the amplitude, phase distortion could be corrected.

5. Claims 6, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinonen in view of Biedka et al. [US 2004/0247,041 A1].

For claim 6, Heinonen teaches the transmitter [Fig. 1], but fails to teach the applying amplitude modulation to a phase-modulated signal obtained by modulation of a phase signal of the transmitting signal.

Biedka et al. [Biedka] teaches an amplitude modulation variable gain amplification means [Fig. 1] for applying amplitude modulation to a phase-modulated signal obtained by modulation of a phase signal of the transmitting signal and outputting an amplitude-modulated signal [the applying of AM in block 113 based on the magnitude information paragraph 0013, to modulate the supply voltage of amplifier 109 which receives the phase modulated VCO signal from PM 103, paragraph 0012],

wherein the power amplification means [109] amplifies power on the basis of the amplitude-modulated signal [109 amplifies its input signal based on the AM signal Vpa on the supply terminal, paragraph 0013], such that the amplitude modulation can be transmitted while amplifying phase modulated signal, as shown in Fig. 1. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve Heinonen with Bieka's amplitude modulation to phase modulation at PA 109, such that the amplitude modulation can be transmitted while amplifying phase modulated signal.

For claim 8, Heinonen teaches the transmitter [Fig. 1], but fails to teach the wherein the amplitude modulation applied to the phase-modulated signal by amplitude modulation variable gain amplification means is performed on the basis of the supply voltage of the amplitude modulation variable gain amplification means.

Biedka teaches the wherein the amplitude modulation applied to the phase-modulated signal by the amplitude modulation variable gain amplification means is performed on the basis of the supply voltage of the amplitude modulation variable gain amplification means [the amplitude modulation AM 113 applied to supply terminal of PA 109 which is amplifying the VCO signal having phase modulation signal from PM 103, Fig. 1, paragraph 0012-0013], using the same rationale for claim 6 above to combine Biedka to Heinonen.

6. Claim 7 is rejected under 35 U.S.C: 103(a) as being unpatentable over Heinonen in view of Biedka, as applied to claim 6 above, and further in view of Toyota et al. [US 2004/0203,553 A1].

For claim 7, Heinonen teaches the transmitter [Fig. 1]. Heinonen teaches the variable gain amplifier 10, 18 in Fig. 1. Heinonen & Biedka fail to teach the wherein the amplitude modulation amplification means is provided in front of gain amplification means.

Toyota et al. [Toyota] teaches the amplitude modulation amplification means is provided in front of gain amplification means [the amplitude modulator is in front or amplifier 70 in Fig. 7], such that the amplitude modulation can be provided before reaching the power amplifier 70, as shown in Fig. 7, in order to reduce the complexity of the power amplifier for providing the amplitude modulation also. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Heinonen, Biedka with

Toyota's amplitude modulation, such that the amplitude modulation could be provide earlier & before reaching the power amplifier, to reduce the complexity of the power amplifier.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinonen in view of Biedka, as applied to claim 8 above, and further in view of Yamawaki et al. [US 2005/0176,388 A1].

For claim 9, Heinonen teaches the transmitter [Fig. 1]. Heinonen & Biedka fail to teach the limiter circuit for the squaring signal.

Yamawaki et al. [Yamawaki] teaches a limiter circuit provided in front of the amplitude modulation variable gain amplification means for converting a sinusoidal signal into a square signal [the limiter 210/208, for converting sine waveform input at MOD terminal of 230 into square waveform, is in front of the amplitude modulation occurred at 200 from amplifier 217 & the variable gain amplifier 214, Fig. 2, paragraph 0047 & its corresponding description in the specification], in order to conveniently provide the detected amplitude information for the amplitude modulation. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Heinonen, Biedka with Yamawaki's limiter 210/208 for converting input sine waveform signal into square waveform, such that the amplitude information could be conveniently detected and provided to the amplitude modulation.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinonen in view of in view of Shimizu [US 2002/0031,191 A1].

For claim 12, Heinonen teaches the transmitter [Fig. 1], but fails to teach the extracting amplitude and phase components of the transmitting signal on the basis of in-phase and

quadrature components of the transmitting signal; and a phase modulation means for outputting a phase-modulated high-frequency signal on the basis of the phase component of the transmitting signal.

Shimizu teaches an amplitude/phase extraction means [phase signal/amplitude signal generation unit 1, Fig. 4] for receiving the transmitting signal as an input [base band input in paragraph 0156] and extracting amplitude and phase components of the transmitting signal on the basis of in-phase and quadrature components of the transmitting signal [1 generates phase signal with I'/Q' to D/A 3/4 & amplitude signal to delay 23, Fig. 4 & its corresponding description in the specification]; and

a phase modulation means for outputting a phase-modulated high-frequency signal on the basis of the phase component of the transmitting signal [the phase modulation loop 70 receiving phase signal from 55], in order to provide the phase modulated signal based on the phase information in the base band signal. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve Heinonen with Shimizu's phase/amplitude generating unit 1, in order to provide the phase modulated signal based on the phase information in the base band signal.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinonen in view of Biedka, as applied to claim 8 above, and further in view of Shimizu'-191 A1.

For claim 13, Heinonen teaches the transmitter [Fig. 1]. Heinonen & Biedka fail to teach the extracting amplitude and phase components of the transmitting signal on the basis of in-phase and quadrature components of the transmitting signal; and a phase modulation means for outputting a phase-modulated high-frequency signal on the basis of the phase component of the transmitting signal.

Shimizu teaches an amplitude/phase extraction means [phase signal/amplitude signal generation unit 1, Fig. 4] for receiving the transmitting signal as an input [base band input in paragraph 0156] and extracting amplitude and phase components of the transmitting signal on the basis of in-phase and quadrature components of the transmitting signal [1 generates phase signal with I'/Q' to D/A 3/4 & amplitude signal to delay 23, Fig. 4 & its corresponding description in the specification]; and

a phase modulation means for outputting a phase-modulated high-frequency signal on the basis of the phase component of the transmitting signal [the phase modulation loop 70 receiving phase signal from 55], in order to provide the phase modulated signal based on the phase information in the base band signal. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve Heinonen with Shimizu's phase/amplitude generating unit 1, in order to provide the phase modulated signal based on the phase information in the base band signal.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinonen in view of Sevic et al. [US 2003/0102,910 A1].

For claim 14, Heinonen teaches the transmitter [Fig. 1], but fails to teach the quadrature modulator for the AM, PM and outputting to variable gain amplifier means.

Sevic et al. [Sevic] teaches a quadrature modulator [Fig. 4C] for receiving the transmitting signal as an input [receiving transmitting signal I/Q form source 402c], applying phase modulation PM and amplitude modulation AM to the transmitting signal and outputting the modulated transmitting signal to the variable gain amplification means [the quadrature modulator for PM with the AM performed in VGAs 450c/460c, Fig. 4c & paragraph 0045], in order to provide improvement allowing practical processing of the rapid

phase changes in the polar modulation signals [paragraph 0004]. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to upgrade Heinonen with Sevic's AM, PM, such that the polar modulation signal could be better for the rapid phase changes condition.

Claims Objection

11. Claims 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The cited prior arts fail to teach the limitations in **claim 10**, for a transmitter comprising a multiplier for multiplying the amplitude signal of the transmitting signal and the phase-modulated signal obtained by modulation of the phase signal of the transmitting signal to thereby apply amplitude modulation, wherein the power amplification means performs power amplification on the basis of the amplitude-modulated signal.

The dependent **claim 11** is also being objected to due to its dependency upon the objected claim 10 above.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A. **Mochizuki [US 6,580,901 B1]** teaches the control unit 8, Verror, V'p, for controlling the supply voltage of power amplifier 2 [Fig. 6 & its corresponding description in the specification] based on the instantaneous output feedback from amplifier 2 for the saturation type high power amplifier [abstract].

B. **Mattila et al. [US 5,432,473]** teaches the digital transmission mode and the analog

transmission mode with bias control 7 for power amplifier 3, having the gain cotrol 1 and driver amplifier [Fig. 1, abstract].

C. **Bachman, II et al. [US 2005/0017,801 A1]** teaches the feedback from power amplifier 10 via coupling 38 for controlling the power of amplifier 10 via power supply 74 [Fig. 1, abstract, & its corresponding description in the specification].

D. **Ayun et al. [US 7,250,818]** teaches the feedback of detected transmitter output power at 107 [Fig. 2] & providing Vcont signal to voltage regulator 151 for power amplifier PA 101 [abstract, Fig. 2 & its corresponding description in the specification].

E. **Tanaka et al. [US 2004/0198,258 A1]** teaches the amplitude modulation to PA 6 via power supply voltage generator 3 and phase rectangular window 13 [abstract].

F. **Schwent et al. [US 5,060,294]** teaches the linear mode and the saturation mode of a power amplifier for a radiotelephone having mode control switch 206/196 [col. 12, lines 10-57, Fig. 9, abstract]

G. **Kim et al. [Us 7,129,786 B2]** teaches the bias circuit of high power consumption mode 319 and low power consumption mode 317 [Fig. 3, abstract].

H. **Yamawaki et al. [US 2005/0176,388 A1]** teaches the phase control loop and the amplitude control loop [Fig. 1, abstract, & its corresponding description in the specification.

I. Other prior arts are also considered. They are: **Staszewski et al. [US 2004/0151,257 A1], Sahota et al. [US 2004/0023,620 A1], Maerzinger et al. [US 2006/0154,626 A1], Bengtsson et al. [US 2002/0071,497 A1], Black [US 5,559,471], Boesch et al. [US 6,298,244 B1], Tsutsui et al. [US 2002/0030,541 A1], Korol [US 7,009,447 B2], Bar-David [US 6,437,641 B1], Morimoto et al. [US 2006/0159,198 A1], Kim et al. [US 6,020,787], Robinson et al. [US 2004/0266,366 A1], Sander et al. [US 2002/0177,420 A1].**

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (571) 272-7889. The examiner can normally be reached on 8:00am-5:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles Chow C.C.

August 15, 2007.

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